

ABSTRACT OF DISCLOSURE

An improved magnetic bearing that uses permanent magnets to provide the bias flux. The magnetic circuits generating the control flux and bias fluxes are substantially non-coincident but share the same path over some portions that include radial and axial airgaps allowing for a low reluctance and an efficient path for the electromagnetic flux. The flux paths of the permanent magnets are completely defined with minimized airgaps for achieving higher forces and efficiency and very low control currents that produce extremely large forces. A single coil and amplifier for the axial force control and two coils with one associated amplifier for each radial axis of control provides simplicity and cost effectiveness. A single thrust disk is provided that is reacted against for both radial and the axial displacement. The permanent magnets used in the present invention are first fabricated and axially magnetized as segments or as continuous rings prior to being mounted on the sides of the rotor pole, providing an effective and inexpensive technique of manufacturing magnetic bearings.